



# MDC Resource Science

## Reintroduced Elk Response to Deer Hunt Disturbance in Missouri

### Science Notes





# Reintroduced Elk Response to Deer Hunt Disturbance

By Amy Bleisch, Barbara Keller, Lonnie Hansen, Thomas Bonnot, Trenton Smith, and Joshua Millspaugh

## Background Information

From 2011 to 2013, the Missouri Department of Conservation transported 108 elk from southeastern Kentucky to the Missouri Ozarks with the goal of restoring a wild population within 3 counties. Successful elk reintroductions in eastern states provide economic and recreational opportunities, but newly released animals may be sensitive to human disturbance. The response of established elk populations to disturbance ranges from regular use of residential yards to temporary range abandonment. Elk readily become accustomed to nonfatal, repetitive, and predictable disturbances. However, elk may have more intense responses to disturbance shortly after reintroduction due to unestablished ranges and stress associated with transport, capture, and release in a new environment. Animals that are disturbed may be displaced from the release site, which can lower reproduction and survival. One example of disturbance is hunting, which can displace sensitive species to alternative habitats.

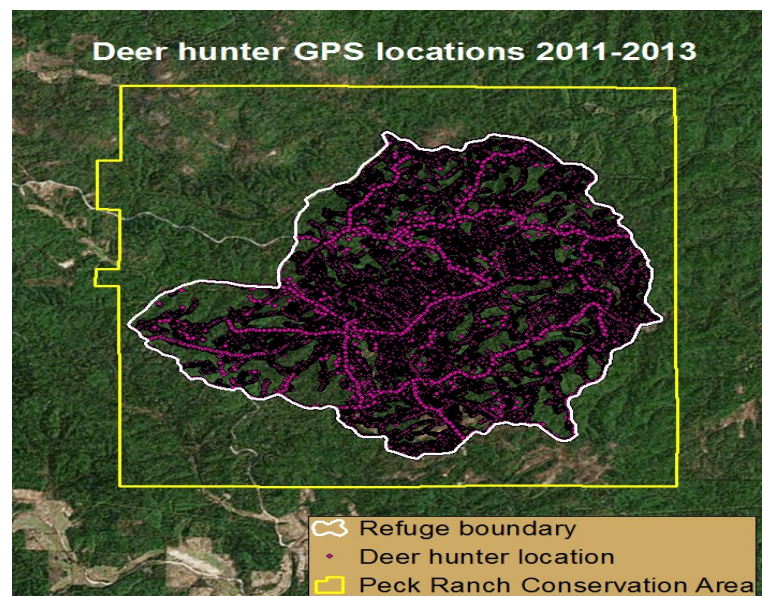
## Research

We studied reintroduced elk movements and hunter-elk interactions in response to deer hunts in Missouri in 2011, 2012, and 2013. Peck Ranch Conservation Area (PRCA), the core of the elk range, is managed for multiple uses. The PRCA holds 3 deer hunts each fall: youth rifle, archery, and muzzleloader. As deer hunts can be an intense, large-scale, and an unpredictable disturbance, there were concerns that the hunts would cause elk to abandon the release site and compromise the reintroduction effort. To quantify movements, we obtained locations from GPS-collared elk every 2-5 hours and measured elk speeds, range shifts, and range sizes in response to deer hunts. We obtained locations from 29 GPS-collared elk in 2011, 36 collared elk in 2012, and 43 collared elk in 2013. We evaluated the impact of factors associated with the hunts (hunter numbers, hunt type, hunt duration, hunt year, number of hunts an individual elk experienced, and timing relative to the hunt) and individual elk (sex, age, release site, and release year) on elk disturbance response. We asked deer hunters to carry GPS units (n=845) during hunts to assess elk-hunter interactions and conducted analyses to determine whether elk were attracted to or avoided hunters. Eleven elk left the PRCA during the first youth rifle hunt. Afterward, only the 2012

muzzleloader hunt caused >3 elk to leave PRCA. Elk speeds increased by 11% during each hunt versus before the hunt. Elk used only 32.2% of their pre-hunt range after each hunt. Overlap of individual elk home ranges before and after each hunt decreased within year but increased between years. Elk ranges were 11% smaller during muzzleloader hunts than youth hunts. Range sizes decreased with hunter numbers, but timing was the primary driver of disturbance response. We observed neither attraction nor avoidance between deer hunters and elk.

## Management Implications

This study provides evidence that elk are adaptable to nonfatal human disturbance even shortly after reintroduction, and that animal reintroductions do not preclude some recreational use of reintroduction sites. Increasing speeds, shifting ranges, and decreasing range sizes, combined with neutral hunter-elk interactions, provide evidence that elk made directed movements and identified refugia within their ranges, thereby allowing them to remain within PRCA during the hunts. Range overlap patterns indicate that elk were both increasingly disturbed as the hunts progressed from youth to muzzleloader each year and decreasingly disturbed from 2011 to 2013. Thus, there is potential for additional deer hunts each fall to displace elk from their ranges, but elk are able to remain on PRCA through deer hunts at the current level of disturbance.



*For more information, contact:*  
Missouri Department of Conservation  
Resource Science Division  
2901 W. Truman Blvd.  
Jefferson City, MO 65109  
573-751-4115  
[research@mdc.mo.gov](mailto:research@mdc.mo.gov)

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